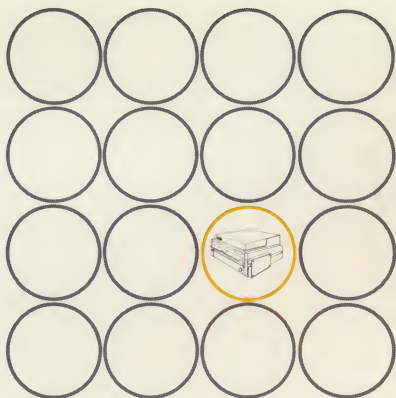


A-MP[★]

Manual Card Reader



AMP INCORPORATED / HARRISBURG, PA.



Two Versions of the Manual Card Reader System

The A-MP Card Reader is available in either the desk top style for operation remote from the main body of equipment, or the rack mount version which fits in a standard 19" relay rack. The pre-wired Model 1042 is available only as a rack mount unit. Other models are available in either style. Detailed information on each of the models follows. Complete specifications and tabular data are located on pages 7 and 8. Wiring diagrams are available from your local District Sales Engineer or by writing to AMP Incorporated, Harrisburg, Pa.

Introduction

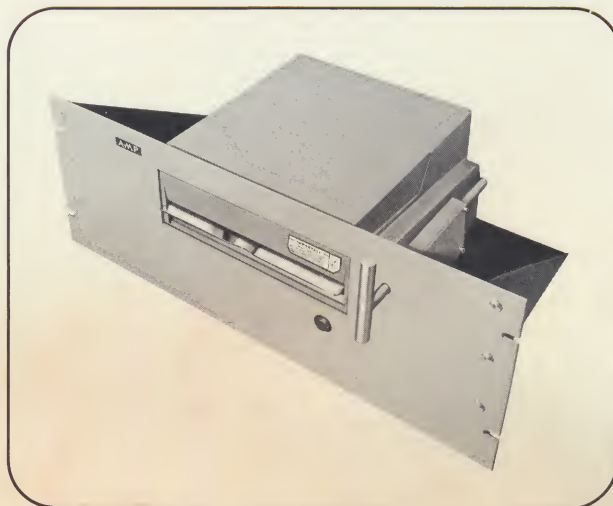
The A-MP SYSCOM★ Card Reader consists of 960 single-pole, single-throw switches that may be commoned in innumerable ways with the use of standard pre-punched tabulating cards and are controlled by a single actuating handle.

The unit, available in desk top or rack mount versions, is lightweight, compact and easy to operate. With the insertion of the card and moving of the actuating handle to the "read" position, contact springs above the card pass through punched areas to the printed circuit card below to complete the desired circuits.

The reader serves as a multi-pole, multi-position switch which permits an unlimited number of programs to be processed with the substitution of one card for another.

When used for individual readout of data, the unit performs the same basic functions as high-speed card readers but permits the individual sorting and verification of cards.

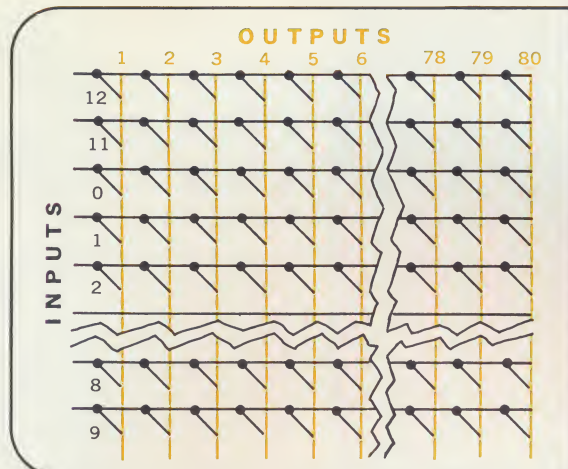
The manual Card Reader provides the answers to unlimited numbers of applications which require that pre-punched holes in a standard tabulating card be translated into useful electrical information. Typical among such uses are—automated process control, test equipment programming, ground support equipment, teaching devices, data processing, instrumentation and a variety of input-output switching functions.



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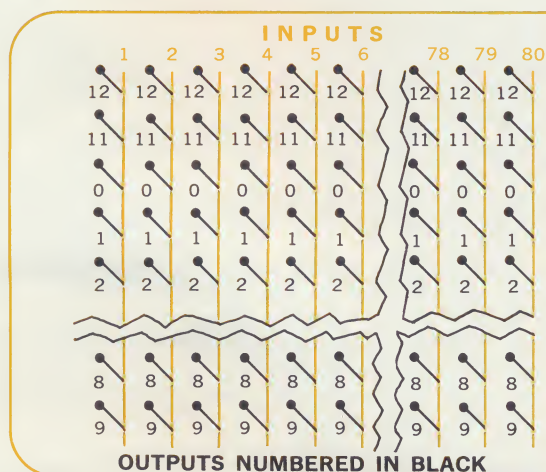
Three Pre-Wired Models



Matrix—Model #1041

The Model 1041 is a matrix type with an 80-column, 12-row matrix configuration. Columns are provided by the 80 pads on the printed circuit board; rows are the contact springs, internally bussed in 12 rows of 80 springs each. The matrix arrangement provides for connecting any of 12 inputs to any of 80 outputs, any of 80 inputs to any 12 outputs, all inputs to one output, or any input to all outputs. Since this model does not offer complete isolation, holes punched in certain patterns create alternate circuit paths . . . sometimes unwanted. Where such alternate circuits are undesirable, the Model 1043 (Diode Matrix) is recommended.

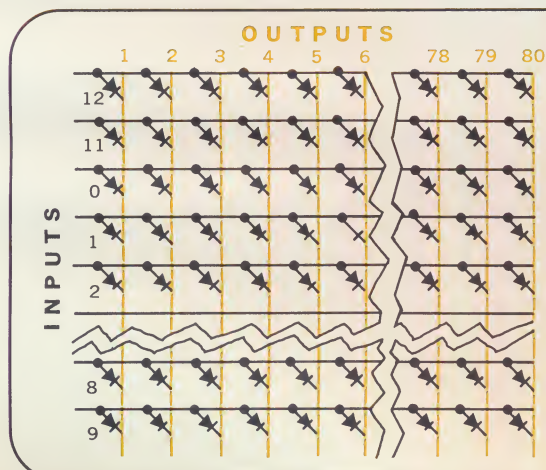
All connections on the Model 1041 are made with A-MP 104-position "M" Series Pin and Socket Connectors with A-MP Type III (+) Contact Pins.



Individual Point—Model #1042

The Model 1042 features 80 input columns with 960 individual outputs, or 960 individual points with 80 outputs. Each of the 80 inputs can be connected to any or all of the 12 outputs. The bussing of two input columns can increase this capability to 24 outputs per input; however, this arrangement limits the number of inputs available to 40.

Maximum flexibility is to be found in this model since its 80 inputs and 960 outputs can be bussed in any required logic pattern. Connections in this model can be accomplished with either ten 104-position "M" Series Pin and Socket Connectors or eight 132-position Miniature DUALATCH★ Connectors.



Diode Matrix—Model #1043

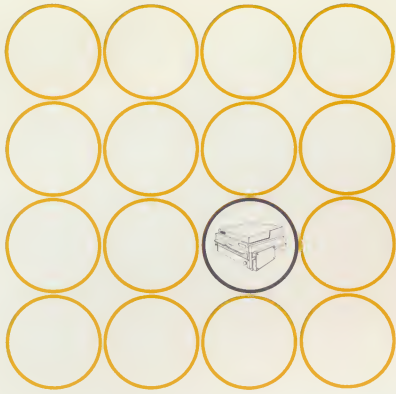
Similar to the Model 1041 this unit offers diode isolation to eliminate alternate paths. Unwanted circuit interaction is prevented by the diodes which act as "one-way valves" from the contact springs to the output columns on the printed circuit board. The anodes of all eighty diodes in each row are bussed together.

The standard diode used in this model is the IN462A. Other diodes and bussing configurations are available on special order.

All connections in this unit are made with A-MP 104-position Series "M" connectors. Unless specified otherwise these are loaded with A-MP type III (+) contact pins.

Special Models

Because of its design flexibility, the A-MP Manual Card Reader can be provided in many variations within the basic housing. The printed circuit board can be adapted to many configurations to simplify electronic system wiring. Contact springs and diodes also may be bussed in a variety of ways. Special connectors or cables are available for unusual wiring requirements. A card reader check list may be obtained from your local District Sales Engineer or by writing to AMP INCORPORATED, Harrisburg, Pa.



Applications

The unrestricted number of programs that can be translated by the Card Reader, plus the convenience of filing permanent records in the form of tab cards, makes this unit practical for a broad range of applications. The Card Reader can be used to program multiple processes of all kinds, and is equally suitable for routing individual circuits in control or checkout operations. The examples discussed on the following pages are actual applications of the reader involving one or both of these functions. The same functions could conceivably be achieved by using various unit configurations in virtually any field of activity.

PRODUCTION CONTROL AND REPORTING

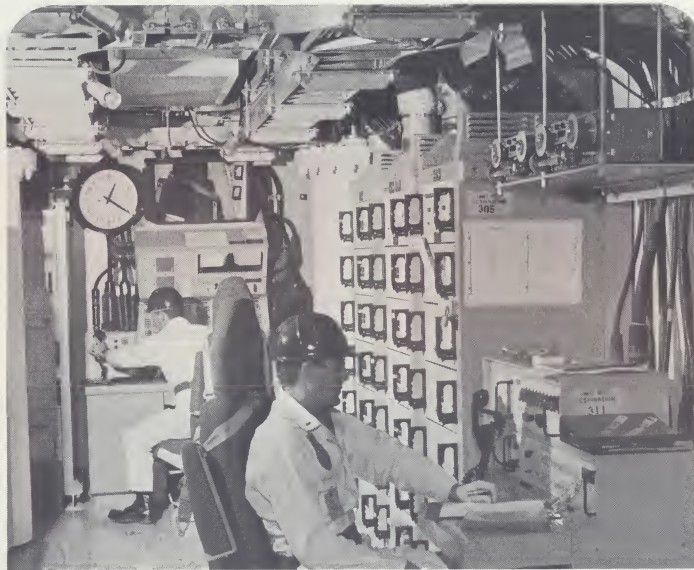
Where data must be gathered from many reporting areas into one central computer on an asynchronous schedule, A-MP Card Readers excel as data input equipment. Location and status of parts in production are reported in seconds instead of days or weeks. Fixed data, such as shop order number, part number, and customer order number, can be pre-punched on a tabulating card for each job. Variable data, such as clock time and operator number, may then be added to the fixed data at each work station. "Exception Reporting" of machine breakdowns and schedule changes can alert production control personnel of problems before they seriously affect production.



BATCH MIXING

Everything from ice cream to exotic rocket fuels can be mixed using the A-MP Card Reader and appropriate mixing equipment.

Changes in formulation, mixing time, mixing sequence, etc. can be made by inserting a pre-punched tabulating card into the card reader. The operator's work is reduced to inserting the appropriate tabulating card and making sure that the ingredient hoppers and vats are filled. Use of pre-punched cards reduce the chance of operator error and insure a consistent product — whether it be ice cream or rocket fuel.



TEST EQUIPMENT PROGRAMMING

Setup time is no longer a major factor in "black box" or module checkout. The A-MP Card Reader has reduced this time to the seconds required to change a tabulating card.

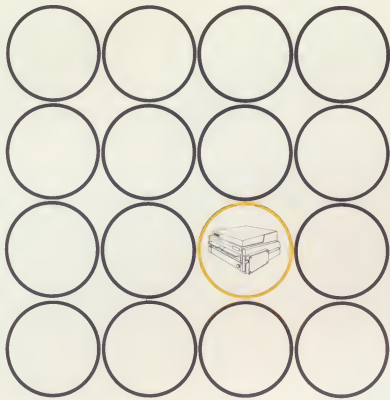
Input and output connections formerly changed manually with clip leads are now changed with a pre-punched tabulating card. The card not only reduces connection time, but also completely eliminates the necessity of re-checking these connections. Pre-punched cards remove the possibility of operator error in connecting the "black box" to the checkout equipment.

TRAINING DEVICES

Manual Card Readers are used in many types of training devices. Inputs simulating anything from control servos on an aircraft trainer to the outputs of a missile guidance system, can be programmed with the change of a card. Whatever the training device or purpose, the card reader allows practically unlimited flexibility in changing input or output signals.

AUTOMATIC WAREHOUSING

Modern warehouse supply and inventory procedures have undergone radical changes in the past decade. Where once there was a stock clerk with an order list and a hand cart, tabulating cards now are used to fill orders. For example, a dispatcher, by inserting pre-punched tabulating cards into a card reader, selects ten cartons of baby food to go into a specific order. The next card could add four cartons of dog food to the same order. All of the items on one order are routed by conveyors directly to a specific loading dock for shipment to the customer. The same tabulating cards can even be used to print the bill.



Features of Standard Models

All standard models have various features in common. These, applicable to both the desk top style or rack mount versions, are briefly described below.

Double-Wiping Action

Reliable sensing is assured through a unique wiping action during actuation of the reader. This causes the contact springs to wipe along the contact pads, until the linkage arrangement travels just over-center, which reverses the wiping action slightly. This brings the contact spring to rest on a precleaned portion of the contact pad.

Simultaneous Readout

When used for data processing applications, the A-MP Manual Card Reader offers simultaneous readout of all holes in any given card. No stepping mechanism is required, thus further assuring the reliability of the reader. Where a memory unit is involved, the data storage requirements are reduced as a result of all 960 bits being presented simultaneously.

Electro-Mechanical Interlocks

Another important feature of the reader is its three electro-mechanical interlocks. These limit switches prevent false output which would be caused by incorrect card positioning. They also eliminate the danger of circuits being closed before all contacts are made. Two of these switches sense the card's position, while the third is closed by the card tray when it reaches "read" position.

Reads Standard Tabulating Cards

Standard 80-column, 12-row tabulating cards are accepted and read by the A-MP Card Reader. Special scored cards used for on-the-spot programming are also accepted by the reader without modification.

OTHER FEATURES:

- AMP Gold over Nickel plating
- Semi-Automatic card ejection
- Diode isolation (Model 1043)

Components and Construction

Simplicity and compactness of design, without limitations on functional capabilities, are outstanding characteristics of the Card Reader. The unit is durable, attractive in appearance and, above all, offers reliable performance. All these factors are detailed in the information which follows:

Housing



The Lower Housing is made of cast aluminum to assure ample rigidity, with precision machining of the castings for proper location and inter-relationship of components. The Upper Housing serves as a protective cover, and is cast from a durable zinc alloy. Both upper and lower housings have a gray, fine wrinkle finish.

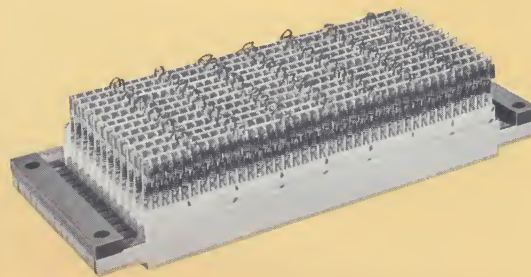
The Front Plate of the sliding Card Tray is chrome-plated zinc alloy, while the Actuating Handle is of machined aluminum.

Operating Mechanism

The Actuating Handle is positioned at the side of the desk top housing and projects through the front panel of the rack mounted version for accessibility. In either case, pushing forward on the handle causes the Card Tray to move the tab card into the "read" position; pulling the handle will return the tray to its original loading position; and a slight additional pull will partially eject the card.

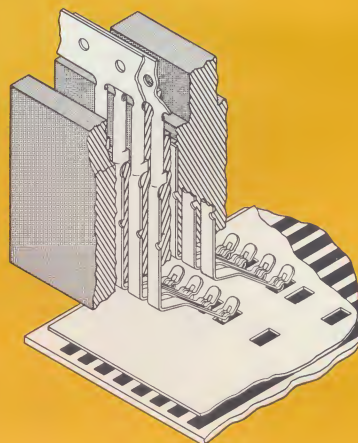
All parts of the operating mechanism are made of steel. Reliability and long, trouble-free service are assured through simplicity of design and precision manufacture.

Diode Isolation



Diode isolation is provided by 1N462A diodes connected to each contact spring. Diode logic boards containing ten diodes, which are cemented to connectors, provide flexibility in reader design and maintainability. Printed circuitry does the commoning within the logic board, while short wire jumpers complete the circuit between each row of boards.

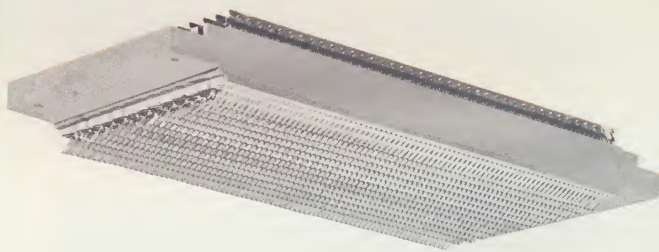
Contact Springs



All Contact Springs are formed of fine-grain, full hard phosphor bronze and plated with .000060" gold over .000050" nickel. The double-wiping action and consistent contact pressure created by the contact design assure reliable hole sensing. The Contact Springs are retained within a diallyl phthalate block. In the Model 1041 the contact springs are bussed by an integral commoning strip.

Spring Block Assembly— Printed Circuit Board

The three models in the 1040 series of the manual Card Reader contain 1040 independent gold over nickel plated Contact Springs which are precisely positioned in a rigid diallyl phthalate block. This fixed assembly is located above the sliding Card Tray. The top surface of the Card Tray is a Printed Circuit Board with a specific pattern of pads. When the reader is in the closed or "read" position the card being read is sandwiched between the Contact Springs in the Block Assembly and the Printed Circuit Board.

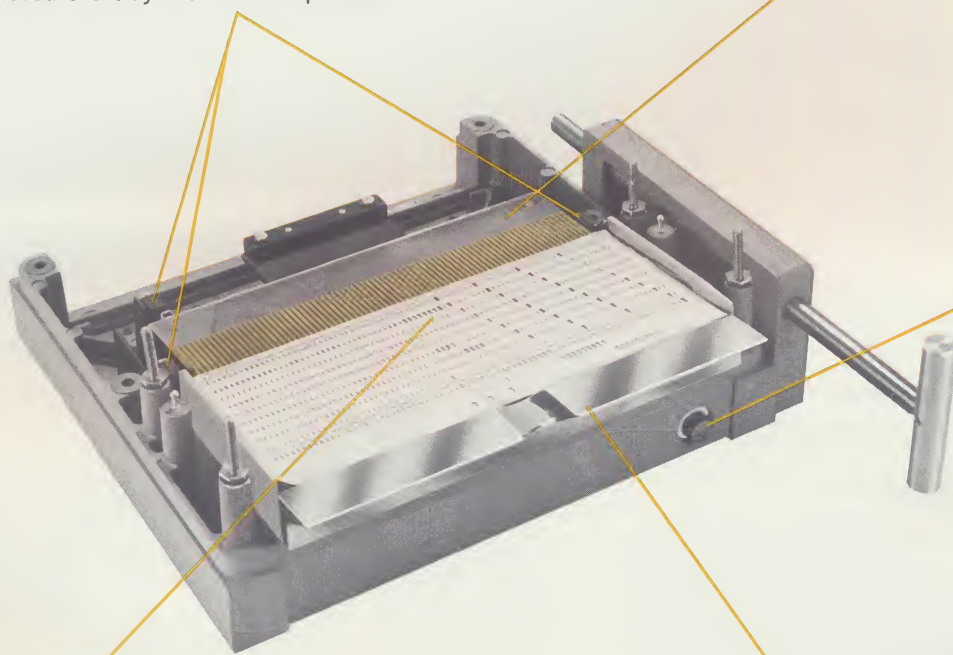


INTERLOCK SWITCHES

Three switches—all rated at 10 amperes 125 volts (nominal)—are used in the electro-mechanical interlock of the reader. Two of these switches prevent reading when a card is incorrectly placed in the Card Tray. The third prevents output until the actuating mechanism has moved the tray into "read" position.

PRINTED CIRCUIT BOARD

As an integral part of the Card Tray, the Printed Circuit Card is made of NEMA grade G-10 (glass filament, epoxy resin) and contains 80 contact pads of 2-ounce copper. Plate. The pads are plated with .000060" gold over .00010" nickel.



INDICATOR LIGHT

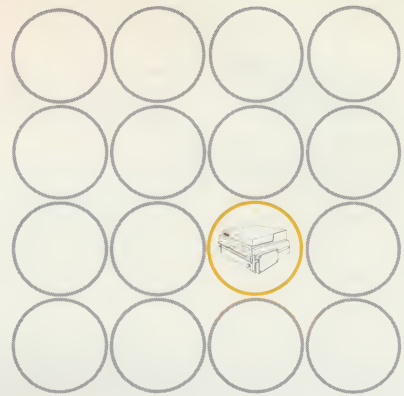
An AMPILLUME★ light is also installed in all models to visually indicate when any card is in "read" position.

CARD TRAY

The Card Tray receives, positions, and carries each tabulating card into "read" position with the Contact Springs. Both sides of the tray help to position the card properly and to hold it in place. Observe from the front of the unit, the left side serves as a register guide and the right side as a spring guide. Moderate pressure of the spring guide presses against the card to hold it firmly to the register guide while the Card Return Spring at the rear exerts pressure to hold the card against the Front Plate.

CARD EJECTOR BAR

This device is located in the forward part of the Card Tray. It functions with the Card Return Spring as an effective card ejecting mechanism which is controlled by the Actuating Handle. The specific role of the Card Ejector Bar is to raise the front edge of the card above that part of the Front Plate which is used for card positioning to enable the Card Return Spring to effect partial ejection.



Mechanical

COMPONENT	MATERIAL	FINISH OR PLATING
Lower Housing	Precision cast, machined aluminum	Fine wrinkle gray
Upper Housing	Die cast zinc alloy	Fine wrinkle gray
Actuating Handle	Machined Aluminum	
Front Plate	Die cast zinc alloy	Chrome plated
Spring Block	Diallyl phthalate	
Operating Mechanism	Precision machined steel	
Contact Springs	Full hard phosphor bronze	.000060 min. average gold over .000050 min. average nickel
Printed Circuit Board	G-10 glass epoxy	2 oz. copper plate, .000060 min. average gold over .00010 min. average nickel

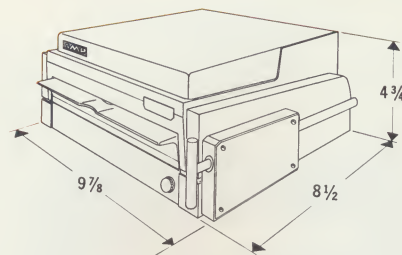
Electrical

PERFORMANCE	MODEL 1041	MODEL 1042	MODEL 1043
Capacitance between adjacent circuits	25 pf. max. at 1 megacycle	25 pf. max. at 1 megacycle	25 pf. max. at 1 megacycle
Maximum operating voltage	500 volts	500 volts	500 volts
Maximum operating current	250 ma.*	250 ma.*	250 ma.*
Contact resistance	20 milliohms at 50 ma.	20 milliohms at 50 ma.	(See diode spec.)
Insulation resistance	Greater than 10 ⁹ megohms	Greater than 10 ⁹ megohms	Greater than 10 ⁹ megohms
Voltage breakdown	1 kilovolt RMS AC	1 kilovolt RMS AC	1 kilovolt RMS AC
Interlock switches	10 amps at 125 volts	10 amps at 125 volts	10 amps at 125 volts

*The current rating is stated at 250 milliamperes, rather than 3 amperes per contact spring, as a safety measure to cover the cumulative effect on the Model 1041, and those wiring variations on the Model 1042 involving more than one input to an output.

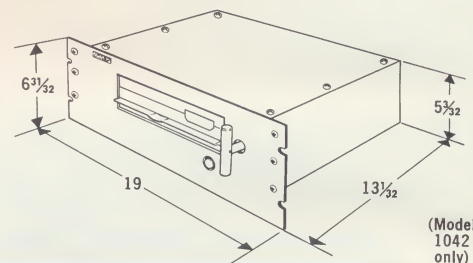
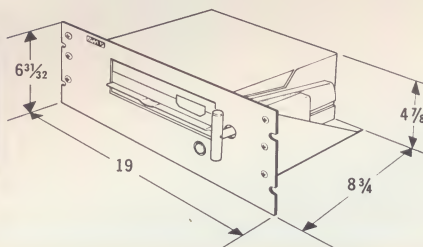
AMP Part Numbers for Standard Card Readers

Desk Top Models



MODEL	TYPE	PART NO.	CONNECTOR		WIRING KIT NO.
			SIZE	QUANTITY	
1041	12 x 80 (Matrix)	497951-1	104-pos. "M" Series center fastener	1	202412-2 or -3*
1042 (unwired)	80 x 960	497952-1	NONE	NONE	NONE†
1043	12 x 80 (Matrix Isolation with diodes)	497953-1	104-pos. "M" Series center fastener	1	202412-2 or -3*

Rack Mount Models



(Model 1042 only)

MODEL	TYPE	PART NO.	CONNECTOR		WIRING KIT NO.
			SIZE	QUANTITY	
1041	12 x 80 (Matrix)	420475-1	104-pos. "M" Series center fastener	1	202412-2 -or -3*
1042 (Series "M" Connectors)	80 x 960	420093-1	104-pos. "M" Series center fastener	10	202412-2 -or -3*
			14-pos. "M" Series	1	202448-1
1042 (Miniature DUALATCH* Connectors)	80 x 960	420093-2	132-pos. Miniature DUALATCH	8	582817-3**
1043	12 x 80 (Matrix Isolation with diodes)	420551-1	104-pos. "M" Series center fastener	1	202412-2 -or -3*

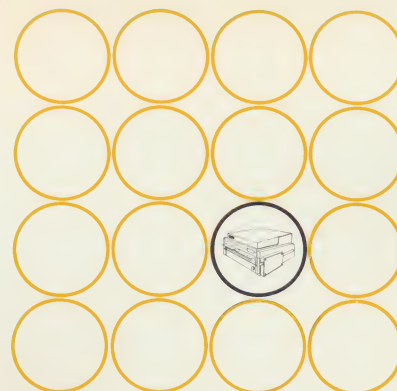
NOTE: Diode models above use 1N462A diodes with cathode-to-spring orientation and anodes bussed.

*Standard model is equipped with 104-position Series "M" Connector Block #201532-2. To order UNSHIELDED Mating Connector Kit, specify AMP #202412-3; SHIELDED, #202412-2. The Model 1042 also employs one 14-position connector—specify AMP #202448-1. Hand crimping tool AMP #45099. Extraction tool AMP #305183.

**Standard model is equipped with 132-position Miniature DUALATCH Connector Block #582435-1. To order mating Connector Kit, specify AMP #582817-3. Hand crimping tools AMP #90071 or #90100. Extraction tool AMP #91003.

†Order A-MP 10-contact Live Pin Connectors—AMP #420589 to mate with desired contact barrels in any row. (Soldering to contact barrels is not recommended.) The dash number with the above base number indicates the length of lead. AMP #420589-1, 12", -2, 24"; -3, 36"; -4, 40"; -5, 72"; and -6, 96".

Installation Wiring

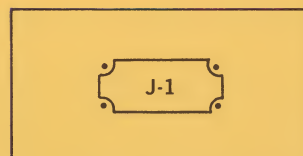


These illustrations show the connector housings for all three standard models, including the Miniature DUALATCH connector option for Model 1042. In every case, each connector block is identified by number and shown in its relative position in the connector housing.

IMPORTANT: The illustrations show the connector block identification as viewed from the mating side of the Card Reader connector housing.

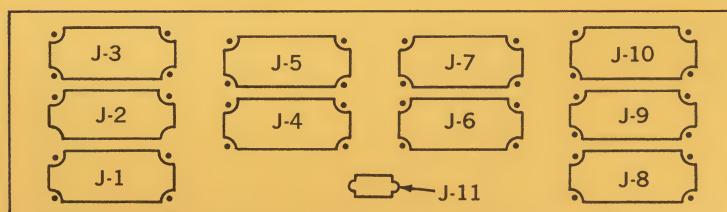
MODEL 1041

One (1) — 104 Position
"M" Series Connector



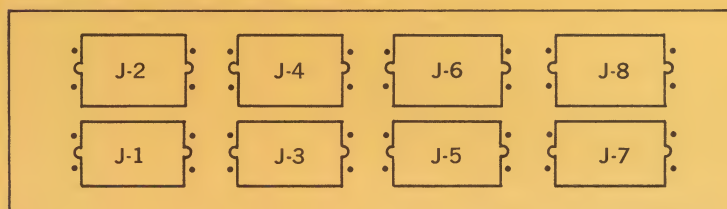
MODEL 1042

(Rack Mount ONLY)
Ten (10) — 104 Position
One (1) — 14 Position
"M" Series Connector



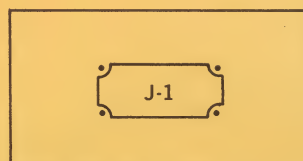
OR
(optional)

Eight (8) — 132 Position
Miniature DUALATCH
Connectors

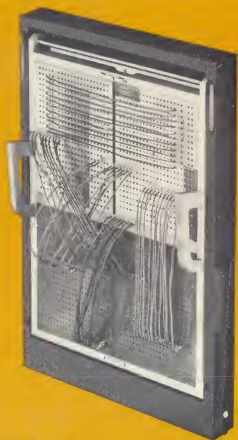


MODEL 1043

One (1) — 104 Position
"M" Series Connector



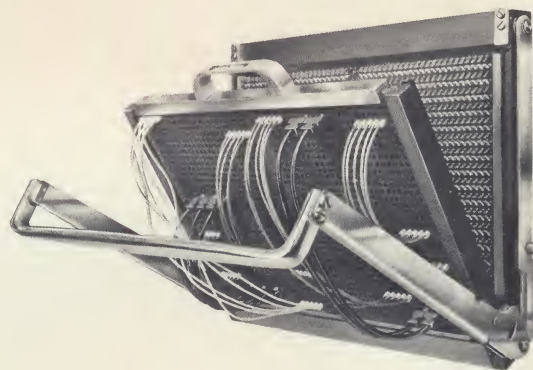
Other A-MP SYSCOM Products



COAXIAL PROGRAMMING SYSTEM

Simple or complex switching of coaxial circuits is facilitated by the A-MP Coaxial Patchcord Programming System. These new systems have been developed for critical low-level switching applications in equipment designed for testing, data handling and processing, communications, analog computers, and telemetry instrumentation. Program changes involving up to 2024 coaxial circuits are rapidly accomplished by changing the removable front boards in the system.

The A-MP Coaxial Patchcord Programming System comprises a lightweight metal frame which houses a molded plastic board containing individual coaxial spring contacts. Redundant contact design and a special camming action of the frame provide AMP's exclusive double wiping action of patchcord tips and contact springs to assure positive, reliable sensing. One-crimp coaxial contacts connect the system with external equipment. Coaxial Patchcord Programming Systems or Fixed Panels are available in a variety of standard models. Special hybrid systems can be designed featuring a mixture of coaxial and universal contacts.



UNIVERSAL PATCHCORD PROGRAMMING SYSTEMS

These products are divided into Panel Mount Systems, Rack Mount Systems, Airborne Systems, Anti-Vibration Systems, and Fixed Panels. With the exception of Fixed Panels, which provide a permanent front programming board, each Patchcord System consists of a permanently wired rear board and quickly interchangeable programming boards patched to specific programming needs. All boards are comprised of a metal frame assembly and panels made of diallyl phthalate or general purpose phenolic. In every instance, patchcords of various types and lengths are used to create diversified programming patterns. The plugs terminating both ends of the cords mate with the contact springs assembled in the rear frame assembly. To complete each circuit, these springs are in turn connected with the internal wiring of the particular equipment in use.



PINBOARD PROGRAMMING SYSTEMS

Matrix and universal type Pinboard Systems round out the line of SYSCOM Programming Products. With both, the programming is completed with the use of specially designed shorting or diode pins. The diode pins prevent unwanted outputs and circuit interaction by limiting current flow in one direction.

The Matrix Pinboard is a "sandwich" construction made up of two honeycombed phenolic blocks with bus type contact strips arranged on X and Y coordinates and separated by an insulating board to prevent inadvertent shorting. Specific programming needs dictate the location of shorting or diode pins. Programming templates facilitate the formulation of programs.

The Universal Pinboard consists of single-pole, single-throw normally open switches operating independently of each other. It has broader capabilities than the matrix type and can be used in digital programming of the inputs to an analog computer.

AMP INCORPORATED

Harrisburg, Pennsylvania